

OIPE

## RAW SEQUENCE LISTING

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:16

Input Set : A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

ENTERED

5 <110> APPLICANT: MBARI  
7 DeLong, Edward  
9 Beja, Oded  
13 <120> TITLE OF INVENTION: Light-driven energy generation using proteorhodopsin  
17 <130> FILE REFERENCE: MBA-101  
21 <140> CURRENT APPLICATION NUMBER: US/09/847,513A  
23 <141> CURRENT FILING DATE: 2001-05-01  
27 <150> PRIOR APPLICATION NUMBER: 60/201,602  
29 <151> PRIOR FILING DATE: 2000-05-03  
33 <160> NUMBER OF SEQ ID NOS: 65  
37 <170> SOFTWARE: PatentIn version 3.0  
41 <210> SEQ ID NO: 1  
43 <211> LENGTH: 105184  
45 <212> TYPE: DNA  
47 <213> ORGANISM: Naturally occurring gamma proteobacterium  
51 <220> FEATURE:  
53 <221> NAME/KEY: gene  
55 <222> LOCATION: (50866)..(51615)  
57 <223> OTHER INFORMATION: Proteorhodopsin gene sequence.  
61 <220> FEATURE:  
63 <221> NAME/KEY: misc\_feature  
65 <222> LOCATION: (1593)..(2807)  
67 <223> OTHER INFORMATION: Predicted threonine dehydratase. Contains 'n' at position 2753. *CR*  
72 <300> PUBLICATION INFORMATION:  
74 <301> AUTHORS: Beja, O., Aravind, L., Koonin, E.V., Suzuki, M.T., Hadd, A., Nguyen, L.P., Jovanovich, S.B., Gates, C.M., Feldman, R.A., DeLong, E.F.  
77 <302> TITLE: Bacterial rhodopsin: evidence for a new type of phototrophy in the sea  
79 <303> JOURNAL: Science  
81 <304> VOLUME: 289  
83 <305> ISSUE: 5486  
85 <306> PAGES: 1902-1906  
87 <307> DATE: 2000-09-15  
89 <308> DATABASE ACCESSION NO: AF279106 *9K*  
91 <309> DATABASE ENTRY DATE: 2000-06-15  
93 <313> RELEVANT RESIDUES: (50866)..(51615)  
97 <400> SEQUENCE: 1  
98 ttgttatatc agtaatggct attgctccaa taacttaata ctaatatata attagtttat 60  
100 gaataaattt tatatatattg ggttattgtt ttttacacta aatgcatttt cttgctcaga 120  
102 tcttctagat acagacatga gagttcttga ttccgctgag tcaagaaacc tttgcgagtt 180  
104 tgaaggaaaa gctttactag ttgtgaatgt tgcaagtaga tgtggttaca cttatcaata 240  
106 tgaatggcctt caaaagttat atgaaagtta taaagatgaa gattttctag taattgggat 300  
108 cccatctaga gattttcttc aagaatactc tgatgaaagc gatgttgagc aattttgttc 360  
110 tacagaatac ggtgttgaat ttcctatggt ctcaactgct aaagtcaaag gaaaaaaagc 420  
112 acacccattt tataaaaaac ttattgcaga atcaggtttt actccctcat ggaactttaa 480  
114 taaatactta atctcaaaag agggcaaggt tgtatccaca tatggatcaa aggtaaagcc 540  
116 tgattcaaaa gagcttatat cagctataga aggcttgctg taaaattatt acttagaaac 600  
118 taatacagtt ttaggcttgt ttgctgcaaa tattccatta tctacaactc caggaatatt 660

## RAW SEQUENCE LISTING

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:16

Input Set: A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

120	attaatcaaa	gcttccattt	cagtgggggt	tgaatatcc	atattagaga	tatctaaaat	720
122	gtgattacct	tgggtctgta	taaatccagt	tctatatgtg	ggtattccac	cgatcgagat	780
124	tatttttctt	gcaacaaggc	tcctactttc	aggtatcacc	tctataggca	gtggaaaagc	840
126	tcccaaaaga	ttaacctatc	ttgactgata	aactatacat	ataaactcgt	tagaggcaga	900
128	agcaactatc	ttttctctag	tatgtgcgcc	accaccacct	ttaataagac	aatttttcagg	960
130	agacacctca	tctgcacct	ctatgtaata	agctatatca	actacatcat	taaggctaaa	1020
132	gacctctatc	ccattttcat	ttaataattt	tgatgaagca	tctgaactag	aaacagctcc	1080
134	agcaaatttg	tgccatgtct	ccttttagttc	ttctataaaa	aaattaactg	ttgagccggt	1140
136	tccaatacct	aaaatcatct	caggatgaag	attatttttg	atatattcta	tagcttggtt	1200
138	agcaacattt	atctttgagc	cactcataga	gttataatac	aagaaaatat	aggtagttaa	1260
140	ttattttgag	actaaaaatt	aaaaaaacag	gttcttttaa	gaattcccag	aagtacctaa	1320
142	agcttattcc	taatgcattc	gtttatgacg	tagcattaaa	atcacctata	acatttgctc	1380
144	taaatatattc	ttcaaaagctg	gggaataaaag	ttttcctaaa	aagagaggat	ctgcaacctc	1440
146	tatttttctt	taaaaacaga	ggagcgtata	acaagattgt	aaattttatcc	gatgccgaaa	1500
148	agaagagggg	ggttattgct	gcatacagcag	gaaatcatgc	tcaaggggta	gccagtgcat	1560
150	gtaagaaatt	aaaaattaat	tgcttgatag	ttatgccaat	aacaactcca	gaaataaaaa	1620
152	taaaagatgt	aaaaagattt	ggagccaaaa	tactccaaca	tggggacaac	gtagatgcag	1680
154	cattaaaaaga	ggcactgttt	attgcaaaaga	aaaaaaaatt	gtcttttggt	catccttttg	1740
156	acgacctctc	aacaattgct	ggccaaggga	ctataggaca	agaaattctt	gaagataaaa	1800
158	ataattttga	tgttgtcttt	gttccggtgg	gaggaggagg	tattctagct	ggtgtatctg	1860
160	cctggatagc	acagaataat	aagaaaataa	aaattggttg	tgttgaggtt	gaggattccg	1920
162	cttgtcttgc	tgaggccgta	aaagctaata	aaagagttat	tttaaaagaa	gtgggcctct	1980
164	ttgctgatgg	ggtggcagta	tcaaggggtt	gaaaaataa	ttttgatgtt	attaaagagt	2040
166	gcgtagatga	agtcattaca	gttagcgttg	atgaggtctg	caccgctgta	aaagatatct	2100
168	ttgaagatac	aagggttcta	tcagaacctg	ctggggcatt	agcacttgca	gggttaaaag	2160
170	cctacgcaag	gaaagttaaa	aataaaaaac	ttattgctat	aagttctggc	gctaattgtaa	2220
172	atttccaaag	acttaatttt	attgttgagc	gatcagagat	tggtgaaaat	agagaaaaaa	2280
174	tattaagtat	caaaatccca	gagatacctg	gaagttttct	taagctttca	aggatgtttg	2340
176	gcagctctca	agttacagag	tttaactaca	ggaaatctag	cttaagcgat	gcatatgttt	2400
178	tagttggtgt	tagaactaaa	actgaaaaat	catttgaaat	cttaagctcc	aaattaaaaa	2460
180	aagcaggctt	caccttttagc	gactttactc	gaaatgaaat	atccaatgat	catctgaggc	2520
182	atatggttgg	tggcagaaat	agtgactcag	gctctcataa	caatgaaaga	atatttaggg	2580
184	gagagtttcc	tgagaagccg	ggcgcgctgt	taaattttct	agagaaattt	ggaaataaat	2640
186	ggmatatttc	cttatttcat	tacaggaacc	taggttcagc	ttttggaaag	atattaattg	2700
W--> 188	gcacgcagag	taaggataaa	gacaagctaa	taaatcattt	aaataagtca	gggactattt	2760 <i>ok</i>
190	ttacagaaga	aacctctaac	aaggcataca	aagatttttt	aaaatgaaag	gttaatactt	2820
192	taatctaaat	ttaattgaaa	aaagctcatc	gctagggttt	tcccacggct	ctttgaacaa	2880
194	ctcggattga	gatctatcat	cctcctcgtc	gtaaattctc	ccacctttag	aatagaccac	2940
196	aaatagatat	gacaaaggag	cgagctcata	tttatactta	atttggaacg	aagctacgcc	3000
198	agtattaaat	tcattaacta	tattatttcc	tttataaagg	tatccattag	catctgaaaa	3060
200	aatactaata	ggattttttg	ctttcaaagc	aacaaattga	ctcttaagtc	tgatctcatg	3120
202	tttattattt	ttaaaccaat	ttagatcaaa	agataaggta	tcttgtcttg	aatcatatga	3180
204	ggcaagatta	ttattatcct	gccatatcag	ccattcattt	tcctttctta	ttctatattg	3240
206	cgcattgatt	cttaagttat	catttggaag	tattgaacct	gctatcttgt	aaaattttct	3300
208	accatacceca	ttcgaatccc	accgattatc	tttctctccc	ttaaagaagc	taactctcca	3360
210	gtcatatgtc	cagaatgaat	agttctttgc	ctcaaagtct	gctgtaatac	ctattcttct	3420
212	ttttgatttg	ataaaggggt	aggcttcatt	ttttcttggt	atagttgtat	ttttcccaga	3480
214	agatctaaaag	ttaaaatcta	attgaaattt	agagttgtcc	ttaaaactaa	aagaattttt	3540
216	ttgatcgatg	cctattggat	ttgaattacc	agctgtgtca	gcatacataa	ttagatcaat	3600

## RAW SEQUENCE LISTING

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:16

Input Set : A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

218	tccataatct	atgtgtttta	atatacgagct	attatcaaat	tcattttattt	ttcgattttcc	3660
220	tccaatacca	gcataaatcc	agtctcttct	ttgcagataa	ccaaagtcot	ttaaactcgaa	3720
222	gtcgtcttca	aaataaagaa	ggcttccact	tatgttagat	agttttatttg	gaagatatgt	3780
224	aaactgagtc	ctatacccaa	gcccattttt	accatctttt	tctgaggcta	acagatctga	3840
226	atatgtaatt	aatttttttg	aacgaatatt	gatgtaatca	ataacattga	ctgttgatga	3900
228	ttcgctgttc	atttcattct	caacattcgt	taccatgaag	ccaagcgttt	tattttccaag	3960
230	ctttgttoga	gatogaagag	cataatagtc	tcttccaact	gaaaaggctt	catcagcctc	4020
232	acttgctaca	aatactccaa	attcattatt	attacttttt	tgagtaagtc	ttaatgcaaa	4080
234	atcaatatca	gaatagtttt	ttttagctgc	ctcgcaacct	tcttcattac	tttcttctga	4140
236	gcaattatag	ctggggggcag	ctccaatcct	ccgcgtattt	ataaccgagt	atctatcata	4200
238	attactaata	tcaaatagtg	attggttttc	attgaaaaat	gctctttttt	ctgagtaaaa	4260
240	agtttcttga	gcagaaaagt	taataaccac	atcatcactc	tcagcttgtc	cgaaatctgg	4320
242	attaatagct	aaattttattt	gacgaccttt	tccagtgcct	taaaagattt	cagccccaat	4380
244	atctgacctt	tcttggtttg	taactgaatt	tttatttgaa	gatataatg	gaaaaaagt	4440
246	aagctttgat	tttgtatagt	tttgtatttc	taagctatct	aactcttgaa	agtagtcatt	4500
248	tctactagcc	attgttccgg	cactgctaac	ccatgactca	ttttcggcac	tataacgtaa	4560
250	tgcggtgtaa	ttaatttttc	ttatatcacc	atcaggctgt	ttcatttaacg	ttacatccca	4620
252	aggaataaaa	aactcagaga	cccaatacc	atcaaatttt	tgtgtttttg	caatccaatc	4680
254	tccatcccag	tctgtcttaa	agtctcctgc	ttgcgttttt	atggcatcga	aaagcgagtt	4740
256	cccaagattt	atagcaagaa	tgaaagcttt	gttaccatca	ccatcaaagt	ctatatattat	4800
258	agagttttta	tcgctaagtg	aattttatttg	atctctaaag	gtcttctctg	agaacataga	4860
260	atcattactt	tgaaaattct	taaatccaac	atatatacca	tccttatttg	agaaaattaa	4920
262	agccgttgta	agaagttcat	ttttcttaag	agtaaaagga	gatgtttcat	aaaaatctgt	4980
264	aattttcaaat	gcattattcc	actcaggctc	atcaagagag	ccatcaataa	caattgagtt	5040
266	tgaccaaate	agcacagagg	taagtaaaag	tgataatgag	gctaaagtta	ttttcataga	5100
268	tagattttaat	tcagagtatt	ttaatctatg	aagagttaga	aatcatccga	tcattctcag	5160
270	aaaaaacata	atcatattta	aggctatgtt	tttctccaaa	atgcatatta	caaactctggt	5220
272	attgataaca	cagtccaacc	aataaaggct	ttgataacct	ctcgttttata	gagccaataa	5280
274	ttctatcgaa	atatccagag	ccatagccaa	gcctgtatcc	atttaaatca	actcctgtca	5340
276	taggaataaaa	cattaaatca	atttcattta	tggtgacata	atcttcaact	ttaacctctt	5400
278	tgatcccaaa	ttgatttata	aagaagttag	gctgctcatc	cagcaaatta	aaagccatca	5460
280	tttcgtcatc	aattactttt	ggaatataaa	tattcttttt	aagtttagta	aaagcttgaa	5520
282	ttaacaaatt	tgtattgact	tcatttcgaa	aaggaaaata	taaggcaatg	ttttgcattt	5580
284	catgagtatt	gattttttct	aatacatttt	cttggtattaa	aaaacttata	ttgctcttag	5640
286	ataaatcaga	aatagactgc	ccctgctcaa	agagtgtatt	tcgtatttta	tttttcacca	5700
288	taaattgtgc	cgaggctaac	aaaccaaatc	acgcgatgt	gctataacct	aaccgatggg	5760
290	tcagggtggtg	aatttcataa	caaatacagg	ttccctgtaa	aggtactgcg	caacaatgct	5820
292	agaggaatat	cacctattta	attgtatcgg	ttcaaattta	ttaacacatt	agcgtatgaa	5880
294	ccagaatgca	gttaattata	aaatatatag	gtattaagta	aaagttaatt	tttagagagc	5940
296	agactctatt	ttttgtatta	gcttttcgat	atctttatta	tttaaagcag	agtcagtatt	6000
298	ctcggttggc	ttggataaaa	gcttactagc	catagttaga	ccagctatca	ccaaggcatt	6060
300	attcttatca	ctgatgccat	caagctcatc	atttaataat	tttgagctc	taatgagttg	6120
302	gtctttctct	tctggcggac	aggctaacgt	cagatctcgg	ccaaaaattc	ttaaagatag	6180
304	cgtttccatt	tctgacatta	ttttttgagt	ttagttattt	ctttatttag	tatgagctta	6240
306	tcttttttcc	agtctctttc	cctttgcaca	taagaatcta	ttattccttt	ttgctcatca	6300
308	aatcttttta	tcaaaagatc	taccttatcc	tctagtcca	ataatgatga	ttttttttct	6360
310	tctgacattg	tataagttta	attgtactag	aatgaattgg	aaagtttctt	taataaaaga	6420
312	gtaaaataag	gcattgaaaa	aataattttt	aaaaacagaa	gagattcact	tataaaacac	6480
314	ctacctaaga	attcagcctt	aattgtacct	ggtgcagatt	tgcaatatag	aaatgctgac	6540

## RAW SEQUENCE LISTING

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:16

Input Set : A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

316	tcattcttata	atttaagaca	ggaaagtagc	ttctactatc	tgtctggcctt	ttgtgagccc	6600
318	tcttctctaa	tggtttttagt	taataatgga	aaaagcattg	attcaataat	ttttgttcct	6660
320	gaaaaagata	aacttaaaga	aatctgggat	ggttatcgag	ctggccctga	gggcgcaata	6720
322	aatgattttc	tttttgatca	agcttttgaa	aataataaat	cagatgcttt	aatgcctgaa	6780
324	atccttcaag	ggctagaaaa	agttttttat	tcaataggga	agaaaaatgg	ctttgatcag	6840
326	aaagtaattg	actggacatg	cgcagcaaat	tctaaagata	ggcacagcaa	atcaattgat	6900
328	attattgatg	gctcttcgat	ggtaggaaat	ttaaggctta	tcaaagataa	gcatgaaatt	6960
330	gatattatga	agagagcttg	tgaaatttca	gctgaatcat	atattgaggt	catgaaatct	7020
332	ataaagcctg	gggacaatga	gcaggaaata	gaggcgctat	ttttatatga	attcgccaaa	7080
334	aggggaggaa	ggtttccagc	ttatacacct	atagttgctg	gaggtgaggg	tgcttgtgta	7140
336	ttgcattata	ttgaaaatga	taaagagtta	gcttcatcag	atttaatttt	ggtagacgca	7200
338	ggatgtgaat	acaaaatgta	tgcattctgat	atcacaagaa	ccttcccagt	aagtggaaaa	7260
340	ttttcagatg	aacagctaca	aattttataat	attgtccaca	aagccaatct	tgttgcaatc	7320
342	gatgctgtaa	aaactggtaa	tagcataatg	gagccccaaa	tggtttcaga	aaaagtaatt	7380
344	actgaaggtc	ttgtagagtt	gggtatttcta	tctggcgatg	ttaatcagct	tcataaaaaat	7440
346	ggtgcattca	aggactttta	tatgcataag	gtgggacatt	ggcttggact	tgatgttcat	7500
348	gatgttggtg	actacatgga	gggagatgag	tttatgaagt	ttaagccagg	gatgataacc	7560
350	acaatcgagc	caggcatcta	tatcagtagc	gcaatggatg	tagatgacaa	atggaaaaggc	7620
352	atcggcataa	gaatagagga	cgcatacctt	gtaacagatt	caggcaatat	taatctaaca	7680
354	gagaagggtg	catctaattcc	tcaagaaata	gaatcattga	tggcttagac	tatggaggtt	7740
356	ccaattgtta	tttctggcgg	agggataata	ggtaattaca	tttctcttag	gcttgaaaaa	7800
358	aataatatca	aaaccgttat	tgtcgaaaaa	gctagtagtt	tcaaagccct	agataagggg	7860
360	ataagaacag	tactctcaaa	tgagcattct	atgcaaatgc	taaaaaatat	tggattttgc	7920
362	ccatcaattg	ctcaaatcaa	cagcatcgac	gtattagatg	gtgaggggtac	aggcaaaatt	7980
364	caattttctag	caaaggacgt	aggcagcgaa	aacctttcat	atgtaaccta	tttcaatgaa	8040
366	ttacaaaaac	taattttctga	tccatgtaaa	gaaagaacct	tatttaataa	tgagattgat	8100
368	tcagttcaga	atcttaatac	agaatctgat	ccagagatca	tgcttaaaga	tggcatgacc	8160
370	ataaaaaacga	atctaattgc	tggatgtgat	ggaagaaatt	caaattattgc	aaaaattgct	8220
372	tcaattacaa	gcagcttcga	tgactactta	caaacagctt	taacttttgt	cgttgatatt	8280
374	gataatgatt	cacatggcaa	agctcaccaa	gttttttctg	aaaaaggaat	atttgcactt	8340
376	atgccactcc	cagaaggcaa	gggtgagatg	aataaatgca	cagtggtttg	gtcaataaaa	8400
378	aatcaagttt	tgggagatga	gcctgtatct	gagtttgtaa	aaaataacat	ttcttttttt	8460
380	gaatcaaagc	ttaatgttag	tctcaggggt	aagtcagaaa	ttttaagttt	taaattatcg	8520
382	aaccttcatt	ttgaaaacta	tattagcgga	cctattgttc	ttcttggtga	tgctgctcac	8580
384	tcaattcacc	ccttagcagg	tcaaggtatt	aatctaggat	ttgcagatgc	agatactttt	8640
386	tgtgaagagg	taattagttc	ttataaaaaa	gggattgcct	ttaatgagaa	atcagtttta	8700
388	aaaagatatg	agattagaag	aaaaagtatg	aactttttta	tgttgaagtc	tatggacttt	8760
390	tttgtggatt	tatttggttc	agaaaattta	tatctaaggc	tgatcagaaa	tttaggtatt	8820
392	tcttcgttaa	ataaatcaaa	gtttgttaaa	gcattcttta	taagacatgc	ctctggaatg	8880
394	aataagtttt	aaatttgat	taaacttttt	gaccttttagc	tctaagttct	ttaagaactt	8940
396	cactaatgcc	ttttttatca	atgattctca	taccttttgc	agatacttta	agatttacga	9000
398	acctgttctc	agattcaacc	caaaatttgt	gtgtgtgaag	attaggaaaa	aactttcttt	9060
400	tagtcttatt	tttagcgtga	gaaacattgt	ttcctgactg	tggatcttta	cctgttactt	9120
402	gacatatttt	actcattgaa	acgcgatttt	atagaacact	gaggaactta	gcaatactat	9180
404	tgtgaaacaa	atttattttat	tacggcatgc	acaatctgac	tgggagagct	ctaatacagaa	9240
406	agattttgat	agaccattag	caagaaaagg	cattgaagaa	gcaaataaaa	tatcatgtta	9300
408	ctgcaaatct	cattcaattt	tagtagataa	aatattctgt	agcactgcag	aaagaactaa	9360
410	gcagactttt	gatatatgca	gtgatgggct	taattatcca	atagctgaag	cagtctatac	9420
412	tgatgagctt	tacttttctg	gccctggtga	gatcggttaag	cttatccaaa	gtttaagtga	9480

## RAW SEQUENCE LISTING

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:16

Input Set : A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

```

414 attcattttcc tctgttttaa taataggcca caatccatca atgcaaagt acatagatgc 9540
416 tatttcagaa aatcctcata ttacgtattc aacatgcggg ctggcagaaa ttctcgttga 9600
418 aagttcatgg aaagacttat ctttaaaaaa atgtaagtta aaatctttta ttcaaccagg 9660
420 agagctttta aaattgaaaa acataaaaaat taagatcatt aaccactaa tgggatccaa 9720
422 gataccctta cctcaatatg aaacaaaggg ctcggcagga ttggatttaa gggcatgcct 9780
424 agatagtaat ctcagccttc aagcaggaac atctcagttg atacctattg gttttgcaat 9840
426 gtacttagaa gatcccggtc ttgcagcaat ggttatacct agatcagggt taggttctaa 9900
428 gcatggaatc gttcttggtg atctggttgg gttgattgat tcagactatc aaggagagct 9960
430 aatgggttct gcttgaata gatcagatac agattttgag attaatcctg gagacaggat 10020
432 tgcacaaatg attatagttc cagtgtattc agcagatttt gaaattgtag acgagttcaa 10080
434 tgagactcag aggggagaaa aggggttttg aagttcagggt ataaattgat aaatttactt 10140
436 tttcttgcca aatctttctt caaatttctg aactcttcg ccagtatcaa taattttttg 10200
438 cttaccggtg taaaaaggat gagaagcaga ggatataatca agagggtagt atgggtatgt 10260
440 ttttccatct tcccattctt tctgttgagt cgtatctaata gttgaacgaa tgagaaagaa 10320
442 cttatcagca ctagcgtcat ggaataaaac ttcacggtat tcaggatgta tatctttttt 10380
444 cataataaaa tcaaaatttg gatgagaact ataacaaaaa acaacttctt ttcaatcaaa 10440
446 acatgaaaaa tttttactat gacatagctg tttcattgct tctaaggcaa tgctttactt 10500
448 atagttctga gcttaaaatt acaaaaggaa cccgcgtgct agttcctttt ggtaaaagga 10560
450 agattgtagg agtggttata aaaaatattc aaaagccaga tttcctaaaa aaagcgggag 10620
452 ctataaaaaa aattatcgtc gtacttgatg aatatccttt gttcgacaag ccaatttttg 10680
454 attctatatt gtggtcttct gattactatc atcatcctat tggtagggtt tttatacct 10740
456 ttatacccac cgaattaaga aaaattaata ataaaaaat tgaagcttta agagaatttt 10800
458 ctgaatatcc agtaaatgag gatgataaga aattcgattt aaccaaggat caagaaaaag 10860
460 cagtcaaggc gctttctaaa tctaaaggat tttcaccac tttattatat ggagttacag 10920
462 ggtctggaag aacagaagtt tacttaagag ttgccgaac ttttattaaa aataataagt 10980
464 cagtattagt ttagttcca gaaataaatt taacccccca attgctctcg cgatttgaga 11040
466 atagatttaa tggtgaaatt ggcataatc attctaagca aacagcagct aagagattaa 11100
468 agacttggct aaaagctaaa tttggttcta taaaaataat agtaggaact cgatcttcg 11160
470 ctttagtgcc tttagataac attggtttta taattatcga tgaagagcat gaccaatcat 11220
472 ttaggcagtc agaagggttt aaattctctg ctagagactt aagtataaaa agggcacagc 11280
474 ttgcagatat tccaattatt ttgggatcag caacccttc gctgcaaaact ttaaaacttg 11340
476 taaaagaaaa taaatttata agagttgata ttctaatcga agttgatgga aacaagcctc 11400
478 ctaaaattaat agccttagat atcaataaca gccctttaat aggcggagtt gctaaagaga 11460
480 caattgaagc aatgcaatca accatagaca gaggagaaca ggttctagtt tttattaata 11520
482 gacgaggatt cgtccactc tatcaatgta gtagttgtgg gtgggtagca gattgtaaat 11580
484 cttgtgatac aaatttagtc ttccaccagg caagaaatag attaatattgt cataggtgtg 11640
486 aatctgccta ctctgttaat ttgtcttgct cggcatgcaa gtctaatagac tttaatatgt 11700
488 atggagctgg aacagagaga gttgaagaag ttcttaaaag cagctttgta aagactccaa 11760
490 taattagagt tgatcatgac tcaacaaaaa aagtgggagc tatggaggct atagttaaaa 11820
492 aaattcattc ctcagacgca gcaatttttag ttggaactca aatgcttgca aaaggacatg 11880
494 attttcctaa agtcacctta agcgttattt taaatgctga taatggcctt ataagccag 11940
496 aaattaatgc attagagaaa atatctcaat tgcttattca ggtctctgga agagcaggaa 12000
498 gaaataataa tcttgcaaaa gttattattc aaacaagata tctgatgat ataaatctta 12060
500 ataaaattaa gacaggagat tatatgaaat ttgcttctca atgcctaagt accaatgagc 12120
502 aatgaactt acctccattt actactttat gtctgcttag gtgctcatca ccaactcaaa 12180
504 agagtaatgt agatttccta gagaaagctg ttttaatttt atccaatagg actgatataa 12240
506 atgttattgg tcccttgctc tcattagttt cgaagtcgaa aggaaattat aggcaccaag 12300
508 tctatatcca tgcaccaaag aagacttttt taaataaggt attaaagttt ttgacaacag 12360
510 agtttgaaaa atggccggaa tctaataagg ttaagtggct tttcgacatt gatccaatag 12420

```

**VERIFICATION SUMMARY**

DATE: 08/15/2001

PATENT APPLICATION: US/09/847,513A

TIME: 14:21:17

Input Set : A:\PTO\_VSK.txt

Output Set: N:\CRF3\08152001\I847513A.raw

L:188 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1